SOUTHWEST
APPLIED TECHNOLOGY COLLEGE

COURSE OUTLINE & OBJECTIVES

Offered by the Southwest Applied Technology College (SWATC), this 60-hour online course provides a basic understanding of grid-direct solar photovoltaic (PV) systems based on the NABCEP PV Entry Level Learning Objectives and the 2014 National Electrical Code (NEC). During the online training, students will learn the theory behind solar energy, including identifying how the system's location and orientation affects energy output. At the completion of this course, students will have gained the necessary skills to design a simple residential-sized grid-direct solar PV system using solar PV modules, inverter(s), and balance of system components (BOS).

Prerequisites:

- None

NABCEP Topics:

- PV Markets & Applications – System Types, Energy Conservation, & Energy Efficiency
- Safety Basics – Electrical Shock, Arc Flash, & Personal Protective Equipment (PPE)
- Electrical Basics – Ohm's Law, Electrical Circuits, & Meters
- Solar Energy Fundamentals – Orientation, Shading, & Tools
- PV Module Fundamentals – Module Types, I-V Curves, & Bypass Diodes
- System Components – Modules, Inverters, & Balance of System Components
- PV System Sizing Principles – System Losses, Temperature Limitations, & Software Tools
- PV System Electrical Design – One-Line Diagrams, Electrical Conductors, & Voltage Drop
- PV System Mechanical Design – Mounting Methods & Environmental Conditions

Book(s):

- Photovoltaic Systems (Third Edition) by James P. Dunlop

Registration:

- Cost includes book and online instruction.
- Registration & payment must be completed at least two weeks prior to the course start date.
- To register, contact Nichole Topham at (435) 865-3911.

Upon completion of Solar Fundamentals 1A & 1B, students will meet the training requirements to take the NABCEP PV Entry Level Exam. The cost of the NABCEP PV Entry Level Exam is not included in the course fees and is considered a separate cost.

National Electrical Code (NEC) Topics:

- Table 310.15(B)(16) – Allowable Ampacities of Insulated Conductors
- 690.1 – Scope
- 690.2 – Definitions
- 690.4 – General Requirements
- 690.7 – Maximum Voltage
- 690.8 – Circuit Sizing & Current
- 690.51 – Module Marking
- 690.54 – Interactive System Point of Interconnection
- 690.56 – Identification of Power Sources
- 690.60 – Identified Interactive Equipment
- 690.61 – Loss of Interactive System Power
- 705.1 – Scope
- 705.2 – Definitions
- 705.10 – Directory
- 705.12 – Point of Connection
- 705.95 – Ampacity of Neutral Conductor
- 705.100 – Unbalanced Interconnections